No. 7200119

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Oklahoma Agricultural Experiment Station, Agricultural Research Service, USDA

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF seventeen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW,* THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS ALLOWED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

* [Waived]

WEEPING LOVEGRASS

'Morpa'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* 15th *day of* February *in the year of our Lord one thousand nine hundred and* seventy-seven

Attest:

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Secretary of Agriculture

FORM GR-470
(2-12-71)

UNITED STATES DEPARTMENT OF AGRICULTURE
CONSUMER AND MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

FORM APPROVED
OMB NO. 40-R3712

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION Morpa	2. KIND NAME Weeping lovegrass	FOR OFFICIAL USE ONLY PVPO NUMBER 7200119
3. GENUS AND SPECIES NAME Eragrostis curvula (Schrad.) Nees	4. FAMILY NAME *(Botanical)* Gramineae 5. DATE OF DETERMINATION June, 1956	FILING DATE 3/31/72 TIME 9:00 A.M. P.M. FEE RECEIVED $750.00 CHARGES —
6. NAME OF APPLICANT(S) Oklahoma Agricultural Experiment Station and Plant Science Research Div. ARS, U. S. Department of Agriculture	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)* Oklahoma State University Stillwater, Oklahoma 74074 Beltsville, Maryland 20705	8. TELEPHONE AREA CODE AND NUMBER 405-372-6211,X266 (405) 624-6425 6+10 7/8/76 301-474-6500,X461
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)* State University	10. STATE OF INCORPORATION Oklahoma	11. DATE OF INCORPORATION 12-14-1891

12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all papers:

Dr. R. S. Matlock, Head and Dr. Charles M. Taliaferro 10/20/76
Department of Agronomy
Oklahoma State University
Stillwater, Oklahoma 74074

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

[X] 12A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52, P.L. 91-577)*

[X] 12B. Exhibit B, Botanical Description of the Variety

10/29/76 [X] 12C. Exhibit C, Objective Description of the Variety

[X] 12D. Exhibit D, Data Indicative of Novelty

[X] 12E. Exhibit E, Statement of the Basis of Applicant's Ownership

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable. *(See Section 52, P.L. 91-577).*

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed? *(See Section 83(a), P.L. 91-577) (If "Yes," answer 14B and 14C below.)* [X] YES [ ] NO

14B. Does the applicant(s) specify that this variety be limited as to number of generations? [X] YES [ ] NO

14C. If "Yes," to 14B, how many generations of production beyond breeder seed? Foundation, Certified-two generations

Applicant is informed that false representation herein can jeopardize protection and result in penalties.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes that the variety is distinct, uniform, and stable as required in Section 41 and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act (P.L. 91-577).

2-15-72
(DATE)

James A. Whatley
(SIGNATURE OF APPLICANT)

00001

(DATE)

(SIGNATURE OF APPLICANT)

INSTRUCTIONS

GENERAL: Send an original copy of the application, exhibits and $50.00 fee to U.S. Dept. of Agriculture, Consumer and Marketing Service, Grain Division, Hyattsville, Maryland 20782. Retain one copy for your files. All items on the face of the form are self-explanatory unles noted below.

ITEM

5 Insert the date the applicant determined that he had a new variety.

12a First, give the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method. Second, give the details of subsequent stages of selection and multiplication. Third, indicate the type and frequency of variants during reproduction and multiplication and state how these variants may be identified. Fourth, provide evidence on stability.

12b First, give any special characteristics of the seed and of the plant as it passes through the seedling stage, flowering stage and the fruiting stage. Second, describe the mature plant and compare it with a similar commercial variety grown under the same conditions, and indicate the differences.

12c A supplemental form will be furnished by the PVPO to describe in detail a variety for each kind of seed.

12d Provide complete data indicative of novelty. Seed and plant specimens may be submitted and seeds submitted may be sterile. Where possible, include photographs of plant comparisons, chemical tests, etc.

12e Indicate whether applicant is the actual breeder, the employer of the breeder, the owner through purchase or inheritance, etc.

U. S. DEPARTMENT OF AGRICULTURE
CSMS GRAIN DIVISION
RECEIVED
MAR 31 1972

EXHIBIT A

Origin and Breeding History of Morpa Weeping Lovegrass, Eragrostis curvula (Schrad.) Nees

Morpa is a derivative of the U.S. Department of Agricultures' Plant Introduction No. 208994 which was obtained by the USDA in 1953 from the Rietvlei Research Station, Transvaal, Union of South Africa.

Seed of P. I. 208994 was planted at the Southern Great Plains Field Station at Woodward, Oklahoma in 1955. Following the winter of 1955-56 seed was harvested from surviving winterhardy plants, bulked, and subsequently tested for agronomic worth. ~~Since Morpa weeping lovegrass reproduces by obligate apomixis there should be little or no genetic difference in the originally selected seed and the seed released as Morpa in 1970~~.

The obligate apomictic mode of reproduction insures complete genetic stability and phenotypic uniformity of 'Morpa' progeny through progressive generations of seed increase. In rare instances variant plants have been found in other obligate apomictic species, presumably arising through point mutation, but no such variation has been observed in 'Morpa'.

11/19/76 D - as dictated over phone

EXHIBIT B, Botanical Description of Morpa Weeping Lovegrass, *Eragrostis curvula* (Schrad.) Nees. (Revised 10/20/76)

Plants perennial. Culms 60 to 120 cm tall, densely tufted, erect, simple or sometimes branching at the lower nodes; sheaths narrow, keeled, glabrous or sparsely hispid, the lower densely hairy toward the base; blades elongate, involute, attenuate to a fine point, arcuate spreading, scabrous; panicles 20 to 30 cm long, the branches solitary or in pairs, ascending, naked at the base, at least the lower densely pilose in the axils; spikelets 4- to 11-flowered, 5 to 10 mm long, gray green.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

7200119

OBJECTIVE DESCRIPTION OF VARIETY
Lovegrass
(Eragrostis spp.)

1. SPECIES:
[1] 1 = curvula 2 = chloromelas 3 = trichodes 4 = other (specify) ____
[2] 1 = diploid 2 = tetraploid 3 = other (specify) ____

2. REPRODUCTION:
[1] 1 = apomictic 2 = crosspollinated 3 = other (specify) ____

3. PLANT: (at anthesis)
[ ][ ] days earlier than [ ]
[0][1] days later than [3]
[1][1][0] cm tall
[ ][ ] cm shorter than [ ]
[0][8] cm taller than [1]
[ ][ ] cm narrower than [ ]
[ ][ ] cm wider than [ ]
1 = A67 2 = Catalina 3 = Ermelo 4 = Morpa

[3] Habit: 1 = decumbent 2 = spreading 3 = erect

4. CULMS:
[1] 1 = simple 2 = branched
[1] 1 = no rooting at nodes 2 = rooting at nodes
[ ][ ] average number of culms per plant
[1] anthocynanin: 1 = absent 2 = present
[ ] hairiness: 1 = glabrous 2 = sparsely hairy 3 = densely hairy

5. LEAF SHEATH:
[1] Basal leaf sheath: 1 = glabrous 2 = pubescent
[2] anthocynanin in leaf sheath: 1 = absent 2 = present
[ ] Nerves in leaf sheath: 1 = inconspicuous 2 = prominent

6. LEAF BLADE:
[1] 1 = narrow filiform 2 = broad expanded 3 = other (specify) ____
[3] 1 = flat 2 = subinvolute 3 = involute
[2] 1 = spreading 2 = arcuate 3 = curled
[1] 1 = glabrous 2 = pubescent on lower surface
3 = pubescent on upper surface 4 = pubescent
[0][4] mm width of flag leaf
[2][0] cm length of flag leaf

7. INFLORESCENCE:
[0][8] cm panicle width
[2][1] cm panicle length
[2] Branch angle with central stalk: 1 = 0-45° 2 = 45-60° 3 = 60-75° 4 = 75-90°

[1] Anthocynanin in inflorescence: 1 = absent 2 = present

[ ][ ] no. flowers per spiklet
[ ] spiklets: 1 = appressed to branches 2 = spreading

[ ][ ] mm spiklet width
[ ][ ] mm spiklet length

8. SEED:
[1][3] mm long ~~micrometers~~ (1.3 mm) 11/4/76
[3][2][5] mg. per 1000 seed
florescence: 1 = absent 2 = present

9. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED FOR THE CHARACTER LISTED:

CHARACTER	VARIETY	CHARACTER	VARIETY
growth habit	Ermelo	leafiness	Ermelo
persistance	Ermelo	drought tolerance	Ermelo
cold tolerance	Ermelo	palatability	Ermelo
winter growth	Ermelo		

10. GIVE ANY INSECT OR DISEASE RESISTANCE

11. GIVE TESTING AREA FOR DATA PRESENTED

Oklahoma

EXHIBIT D, Data Indicative of Novelty of 'Morpa' Weeping Lovegrass, *Eragrostis curvula* (Schrad) Nees. Revised 10/20/76.

Morpa probably most closely resembles 'Ermelo' weeping lovegrass. However, Ermelo was informally released through the Texas Research Foundation (Renner, Tex.) without benefit of a pedigree seed increase program. Consequently, there is no assurance that all seed sold commercially as variety Ermelo traces to the accessions tested and released by the Texas Research Foundation. Morpa and Ermelo are morphologically similar but do differ in the following characteristics:

1. Morpa is 1 to 2 days later in reaching the heading stage.
2. In Vitro dry matter digestibility of Morpa is higher during the spring and summer but lower in the fall.[1/]
3. Observations indicate that Morpa is slightly more palatable and slightly taller.[1/]
4. Morpa tends to brown more severely during drought and cold stress.[1/]

When compared with common weeping lovegrass, as exemplified by the Soil Conservation Service strain A-67, Morpa:

1. is 8 to 10 cm taller
2. has darker colored panicles
3. is 6 to 8 days later in reaching heading stage
4. has 0.5-1 mm wider leaves on the average
5. is more palatable and higher in nutritive value as evidence by daily rate of steer gain (see exhibits D-1 and D-2).

1/ See exhibit D-3, pages 27-39, Comparison of weeping lovegrass varieties by Dalrymple, R. L., Mike Payne and E. C. Holt in 1976 Field Day and Progress Report of the Noble Foundation Red River Demonstration and Research Farm. Pub. No. RR-76.

Table 1. Summer palatability ratings of weeping lovegrass selections, Woodward, Okla., 1958 experiment.

Selection	1958 8/26-9/2*	1959 5/26-5/29*	1959 6/16-6/19*	1959 7/27-7/31*	Mean
Morpa	70 a ǂ	83 a	95 a	70 ab	80 a
813	70 a	53 a	92 a	95 a	78 a
Commercial	30 b	8 b	43 b	57 bc	34 b
673	0 c	17 b	38 b	28 c	21 b

* Percentage of plants grazed by Hereford steers, averages of three replications.
ǂ Values within a column followed by the same letter do not differ significantly (Duncan's, p .05)

Table 2. Summer palatability ratings of weeping lovegrass selections, Woodward, Okla., 1960 experiment.

Selection	1960 7/26-8/1*	1960 9/2-9/16*	1961 6/6-6/14*	1961 7/20-7/28ǂ	Mean
Morpa	86 a‡	39 a	31 a	14 a	42 a
813	74 a	27 b	25 a	10 ab	34 a
Commercial	49 b	15 c	20 ab	3 bc	22 b
673	48 b	18 c	9 b	2 c	19 b
253	46 b	16 c	15 b	2 c	20 b

* Percentage of available forage grazed by Hereford steers, averages of ten replications. ǂ Percentage of available forage grazed by Shropshire sheep, averages of ten replication. ‡ Values within a column followed by the same letter do not differ significantly (Duncan's p .05).

Table 3. Summer palatability ratings of weeping lovegrass selections, Stillwater, Okla.

Selections	7/27/61*	10/16/61*	Mean
Morpa	60 aǂ	65 a	62 a
813	10 b	60 ab	35 b
Commercial	10 b	23 bc	17 b
673	37 ab	18 c	27 b
253	15 b	27 abc	21 b

* Percentage of plants grazed by three Hereford heifers. Average of three replications. Data by W. C. Elder. ǂ Values within a column followed by the same letter do not differ significantly (Duncan's p..05).

Table 4. Winter palatability ratings of weeping lovegrass selections, Woodward, Okla.

Selection	1958* 12/17-12/19	1959* 12/7	1960 † 12/19-12/24	1962 † 2/2-2/9
813	60 a‡	58 a	10 b	12 a
Morpa	43 a	17 a	9 b	6 a
Commercial	27 ab	28 a	24 a	2 a
673	4 b	5 a	30 a	9 a
253	---	---	15 ab	2 a

* Percentage of plants grazed by Hereford steers, average of three replications. † Percentage of available forage grazed by Hereford steers, average of ten replications. ‡ Values within a column followed by the same letter do not differ significantly (Duncan's p .05)

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Selection	1958	1959			Mean
	8/26-9/2*	5/26-5/29*	6/16-6/19*	7/27-7/31*	
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813	70 a	53 a	92 a	95 a	78 a
Commercial	30 b	8 b	43 b	57 bc	34 b
673	0 c	17 b	38 b	28 c	21 b

* Percentage of plants grazed by Hereford steers, averages of three replications.
‡ Values within a column followed by the same letter do not differ significantly (Duncan's, p .05)

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Selection	1960		1961		Mean
	7/26-8/1*	9/2-9/16*	6/6-6/14*	7/20-7/28‡	
Morpa	86 a‡	39 a	31 a	14 a	42 a
813	74 a	27 b	25 a	10 ab	34 a
Commercial	49 b	15 c	20 ab	3 bc	22 b
673	48 b	18 c	9 b	2 c	19 b
253	46 b	16 c	15 b	2 c	20 b

* Percentage of available forage grazed by Hereford steers, averages of ten replications. ‡ Percentage of available forage grazed by Shropshire sheep, averages of ten replication. ‡ Values within a column followed by the same letter do not differ significantly (Duncan's p .05).

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673	4 b	5 a	30 a	9 a
253	---	---	15 ab	2 a

* Percentage of plants grazed by Hereford steers, average of three replications. † Percentage of available forage grazed by Hereford steers, average of ten replications. ‡ Values within a column followed by the same letter do not differ significantly (Duncan's p .05)

Table 5. Daily rate of gain of Hereford steers grazing and fed three selections of weeping lovegrass. Southern Great Plains Field Station. Woodward, Oklahoma

Selection	Winter*	Summer*	Overall*
Morpa	.31 a†	.84 a	.49 a
Commercial	.27 b	.77 b	.44 b
673	.26 b	.76 b	.44 b

* Three-year mean gain in kg. † Values within a column followed by the same letter do not differ significantly (Duncan's, p .05)

COMPARISON OF WEEPING LOVEGRASS VARIETIES

R. L. Dalrymple, Agronomist
Mike Payne, Research Technician
E. C. Holt, Professor of Forage[1]
Agricultural Division - Noble Foundation
Route One
Ardmore, Oklahoma 73401

There are four weeping lovegrass (Eragrostis curvula) varieties available commercially: "Common," Ermelo, Morpa, and Renner. Comparisons were initiated during 1973 to determine yields, quality, and various characteristics of the four varieties at three fertilization levels. Certain summarized data from these replicated plots are reported herein.

PROCEDURE

The soil on this plot location is a deep Minco fine sandy loam. The seedbed for weeping lovegrass planting was prepared by discing and spike-tooth harrowing to a level very firm seedbed.

All varieties were planted on May 18, 1973 at two pounds pure live seed per acre with a John Deere LZ-B hoe drill equipped with a grass seed box. Seed and banded starter fertilizer of 16-20-0 at 100 pounds per acre were banded in ten-inch rows on the freshly prepared soil surface. The rows were pressed firm by the drill press wheels. Rains resulted in slight siltation over the seed-fertilizer row for ideal coverage and excellent stand development. This is an excellent method of planting weeping lovegrass in field conditions.

Each variety has been fertilized with three levels of fertilization: low, medium, and high (Table 1). Levels are based more on frequency rather than various rates per date of application. The low level received only spring application , the medium level received spring and late summer applications, and the high level received the spring application plus an application after each growing season harvest. The area is managed as dryland, but the plots were irrigated once during July 1974 to preserve the stand during a severe dry period.

[1] E. C. Holt is professor of forage at Texas A&M University, College Station, Texas, and is responsible for obtaining the digestible dry matter of samples in this study.

Figure 1. (A) Typical Angus x Hereford F_1 Heifer; (B) Typical Brangus x Hereford F_1 Heifer.

Samples are clipped from each plot with a mower set to cut and leave a four-inch stubble. All growth is cut and removed from the plot. Late summer regrowth is left on the plots during winter. This aftermath is burned during late winter to early spring under moist soil conditions.

GENERAL VARIETY OBSERVATIONS

"Common"

This designation is not a variety, but it is basically unselected stock derived from early introductions. The Common seed planted in these plots traces back to early introductions. It had better seedling vigor than other varieties in these tests. Common is slightly shorter and weeps over more readily than other varieties. Leaf tips brown sooner due to moisture stress, temperature stress, and maturity than other varieties. However, it remains greener in the clump than Ermelo or Morpa. Common greens slightly earlier some springs than all other varieties and it remains green in the clump later during early winter than Ermelo and Morpa.

Ermelo

Texas Research Foundation (now Texas A&M University Research and Extension Center at Dallas) released this variety many years ago as being more palatable than Common. It is basically the same type of plant as Common, but it is slightly taller, often darker green, has slightly wider leaves, and is three to five days later in reaching heading stages. Ermelo is slightly earlier in heading than Morpa and it retains a greater amount of greenness. Ermelo and Morpa are very similar varieties.

Morpa

Oklahoma State University and USDA, Woodward, Oklahoma, released Morpa in recent years as being better in palatability and ability to produce beef gains than Common. It is the same basic type of plant as Common. Morpa is up to six to eight days later in heading stages than Common. It appears very slightly more palatable and taller than Ermelo. Morpa browns more severely and completely during drought and cold stress than any other variety. It was the only variety that sustained drought injury during 1974 under high fertility. Morpa is readily available as certified seed.

Renner (Eragrostis robusta)

Texas Research Foundation (now Texas A&M University Research and Extension Center at Dallas) released Renner as being more palatable than Ermelo. Renner is a much more robust, semi-erect, dark green to blue-green weeping lovegrass with a wider leaf than all other varieties. Renner is sometimes later in spring green up by up to over one week. Renner is almost always greener than other varieties and is much more so during mid to late summer up to mid winter (Figure 1). It reaches heading stages

Figure 1. Renner and Morpa weeping lovegrass during late summer when Renner retains more greenness.

earlier than all other varieties by up to one week. This is not a problem in well implemented grazing or haying programs. Renner seems to volunteer much more profusely than other varieties and it is more competitive due to its more semi-prostrate dense crown. It is often slightly harder to mow. It seems to grow better on loam soils and may not do as well as others on very deep coarse sands. Renner has a more abundant root system than Morpa in the upper 18 inches of soil. Renner is the least cold hardy of the varieties but it survives excellently into central Oklahoma. Renner seed is one-third to one-half the size of other varieties and it is a dark rusty-red (maroon) color.

RESULTS

Forage Yields

Three years of forage yields are presented in Tables 2A to 2C. Renner under better fertility levels yielded much higher than the others the first year (Table 2A). Second year yields varied from 7,553 pounds per acre for Morpa under low fertility to 15,610 pounds per acre for Ermelo under high fertility (Table 2B). Renner under high fertility was second highest yielding.

Third season yields varied from 5,903 pounds per acre for Renner under low fertility to 11,603 pounds per acre for Common under high fertility. Vigor of all grasses was much better under the medium fertility level.

Three-year totals or averages show that overall Renner has been the best producer, however, it has been the lowest producer under low fertility levels. Under high and medium fertility, Renner has produced a total of 7,500 and 1,737 pounds per acre more than Morpa for three years. Under low fertility, Morpa has produced 468 pounds more than Renner.

Renner has a greater fall production under fall (August) fertilization than Morpa. Renner under medium fertility produced 2,231 pounds per acre due to fall topdressing compared to 1,754 pounds per acre from Morpa. Under high fertility the response was less but Renner produced 2,059 pounds per acre compared to 807 pounds per acre from Morpa. If a producer is to employ fall topdressing Renner has obvious advantages.

Due to quality and yield relationships we presently consider Morpa and Renner as the top two varieties. Each of these varieties has characteristics that can be considered advantageous over the other. They are different enough to be considered as separate forage components in a forage system.

Yield Relationships

Forage yields of Tables 2A to 2C were converted to percentages to illustrate more generally the relationship of yields between the varieties (Table 3). Morpa was used as the check (100%). In five of nine comparisons, Renner was better than Morpa. In 22 of 27 comparisons, Morpa was inferior to the other three varieties.

Renner was much better than Morpa the first and second season. By the third season the differences were not as great. It seems, from this and other data, that Renner has much better production potential than Morpa where nitrogen and soil moisture are sufficient. Where either input is limited, production is possible only up to that limit and the full potential of the grass will not surpass the limiting factor. To more fully understand this we might use the analogy--a bull is capable of 4.0 pounds average daily gain on full feed. However, he cannot show that potential on just enough feed and/or water to produce 2.0 pounds average daily gain. Forage, such as weeping lovegrass, has these potentials and restrictions just as well.

Crude Protein

Average protein content of all harvests is presented in Table 4. The data does not show drastic differences in overall average protein values, however some differences can be determined from study of the data. A major point is even though Renner produced more grass under medium and low fertility than did Morpa, its protein values remained very close to that of Morpa.

As forage managers--take special note of how protein values continue to decline from spring to fall under low fertility. Under medium fertility, the fall topdressing elevates the protein level appreciably. Under high fertility where regular nitrogen was applied, protein levels remained quite uniform throughout summer.

This tabulated data does not show all. Protein levels under low fertility during the growing season dropped to as low as 4.3%. This is severely nitrogen deficient and low quality pasture.

Digestible Dry Matter (DDM)

In vitro digestible dry matter determinations were made by Texas A&M University (Table 5). Common and Ermelo samples were not analyzed throughout the study. These varieties must be compared under spring and fall harvests only between the two varieties. The same is true for Morpa and Renner. Summer harvests presented here can be compared for all four varieties.

When comparison is made throughout the samples, the varieties in order of digestible dry matter are: Renner, Morpa, Ermelo, and Common. Early spring growth, that would be early grazing in pastures, averaged about 65% to 66% DDM. Severely frozen, lowest quality midwinter dry grass averaged 28% DDM for Morpa during 1976 to 38% DDM for Renner for the same period. January 1976 produced the lowest DDM. Mild February 1976 allowed some greenness to develop and DDM rose to 45% to 46% for Morpa and Renner respectively. Early winter DDM values averaged about 50%.

Quality Yield Per Acre

Time has not permitted full development on figures of pounds protein of digestible dry matter per acre. However, it is obvious that Renner will be the highest by a wide margin. Morpa will likely be second, but Ermelo and Morpa will be close.

at Three
n. Noble

Table 4. Crude Protein Content of Four Weeping Lovegrass Varieties at Three Fertility Levels. Red River Demonstration and Research Farm. Noble Foundation. Ardmore, Oklahoma.

Variety	Fertility Level	% Crude Protein[1] Spring Harvests	Summer Harvests[2]	Fall Harvests	3-Year Average
Common	L	10.6	7.9	6.7	107
	M	10.8	7.6	8.3	107
	H	11.1	11.2	9.6	113
	Avg.	10.8	8.9	8.2	109
Ermelo	L	11.8	9.1	6.4	104
	M	11.5	7.8	9.0	106
	H	12.9	11.5	10.2	117
	Avg.	12.1	8.4	8.5	109
Morpa	L	11.4	8.0	6.5	100
	M	12.0	8.0	8.4	100
	H	12.1	11.7	10.5	100
	Avg.	11.8	9.2	8.5	100
Renner	L	11.2	7.5	5.8	95
	M	11.2	7.7	7.8	107
	H	11.2	11.2	9.0	127
	Avg.	11.2	8.8	7.5	111

[1]Three-year average.
[2]Total of six harvests during three summers.

Table 5. Digestible Dry Matter of Four Weeping Lovegrass Varieties at Three Fertility Levels. Red River Demonstration and Research Farm. Noble Foundation. Ardmore, Oklahoma.

Variety	Fertility Level	% Digestible Dry Matter		
		Two Spring Harvests[1]	Five Summer Harvests	Three Fall Harvests[2]
Common	L	59.6	53.3	49.2
	M	59.6	54.7	48.3
	H	59.6	54.1	51.3
	Avg.	59.6	54.0	49.6
Ermelo	L	59.8	55.3	53.4
	M	59.8	56.4	50.1
	H	59.8	56.1	52.9
	Avg.	59.8	55.9	52.1
Morpa	L	62.0	56.8	44.1
	M	61.9	57.7	42.3
	H	61.3	57.6	46.7
	Avg.	61.7	57.4	44.4
Renner	L	60.2	56.4	45.0
	M	57.7	58.7	49.8
	H	59.2	61.1	49.2
	Avg.	59.0	58.7	48.0

[1]One harvest only on Common and Ermelo; do not compare directly with Morpa and Renner values.

[2]Two harvests only on Common and Ermelo; do not compare directly with Morpa and Renner values.

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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
14th and Independence Avenue, Rm. 1634

WASHINGTON, D.C. 20250

PLANT VARIETY PROTECTION OFFICE

Gentlemen:

Subject: Application No. 72119
Variety and Kind - Lovegrass, 'Morpa'

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificate on the above variety be issued with a notation on each Certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is waived.

It has been agreed that the certificate should be issued in the name(s) of:

OKLAHOMA AGRICULTURAL EXPERIMENT STATION
AGRICULTURAL RESEARCH SERVICE, U.S. Dept. of Agriculture

5/25/76 (Date)

Ralph L. Mitlak (Signature)

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EXHIBIT E, Statement of the Basis of Applicants Ownership.

The Oklahoma Agricultural Experiment Station and the U. S. Department of Agriculture are the sole owners of 'Morpa' weeping lovegrass.

Ralph S. Matlock

Ralph S. Matlock, Head
Department of Agronomy
Oklahoma State University